NEW CITY COURT

Keats House Facade Survey and Reconstruction Methodology

PAYE

By Appointment to
Her Majesty The Queen
Building Facade Restoration
and Conservation

PAYE

KEATS HOUSE,

26-28 ST THOMAS'S STREET

LONDON

PROPOSED FAÇADE DISMANTLING METHODOLOGY

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Contents

1.0 Executive summary.

The façade is a 1½ brick thick monolithic masonry construction with Bath stone dressings and details in an Italianate style.

The building is not listed but is a positive contributor to the Borough High Street Conservation area.

The façade was repaired and restrained as part of a previous retained façade refurbishment project in the 1980's with extensive cementitious repair to moulded sky surfaces and patch repointing.

The stone is restrained to the brickwork using ferrous metal cramps located within the bed joints of the stonework. Fracturing typically caused by cramp corrosion is clearly evident in particular to the window surrounds, and from the GPR survey we are able to determine that there is minimal masonry cover to the cramps with a relatively porous stone.

The recent spate of tall building construction within the area has reduced the drying out effect of direct sunlight on the surface of the façade, assisting in controlling the moisture content within the wall. Therefore, the risk of further corrosion of the embedded steel work will increase over time as the residual moisture level within the masonry increases.

Whilst it is possible to cut out sections of stone, extract and replace the individual corroding cramps and then indent a new piece of stone, such an approach would detract from the original consistent appearance of the window surrounds and there is no guarantee that we will be able to locate every ferrous fixing.

We do not advocate the sliding of the façade because the minimal sway that will occur during travel is sufficient to cause the ferrous cramps enlarged through corrosion to impose additional stress locally and fracture the stonework further.

Carefully dismantling and reconstructing the façade would allow all of the ferrous fixings to be located and replaced with a more appropriate permanent stainless steel restraint fixing without damaging the appearance of the stone façade.

2.0 Introduction.

The site at No 24-26 St Thomas's Street was built in 1862 and is described in Pevsner as *'A somewhat strident contrast is Newman & Billings Italianate style building for Guys Hospital Medical Staff with carvings by Mr Seal of Walworth. Now incorporated in New City Court with offices and hospital staff accommodation extending back to George Yard and the High Street begun in 1982'.*

The walls are constructed of monolithic masonry consisting of hand made red imperial brickwork with limestone dressings forming window surrounds, bays and balconettes. The front entrance porch to the properties is supported by Aberdeen pink granite columns.

The façade comprises a lower ground floor and four floors above with an ornate grand cornice and parapet. The left hand (east) return is approximately 2m in length and the right hand side abuts the modern property.

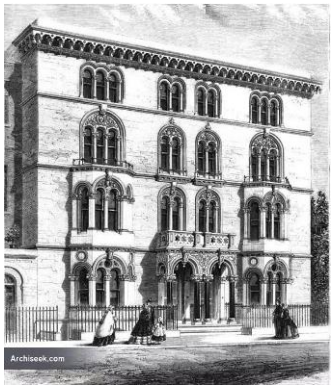
As part of the proposals to encourage additional pedestrian usage of the yards, evolved via discussion with TFL & Southwark, the New City Court scheme allocates some servicing trips onto St. Thomas Street. To facilitate a greater segregation of deliveries and pedestrian movement, Keats House's retained façade is proposed to be relocated circa 2.7m west, whilst the 1980's concrete frame and unsympathetic construction is demolished behind. Given the method of retention in the 1980s a careful unpicking of the two structures will be required following specialist cleaning, and a detailed measured survey / recording of individual components. This will enable appropriate repairs to be made to deteriorating / damaged stone work, and the reinstatement of features lost to the western flank wall via subsequent development (post the 1863 construction of Keats House). This will help enable the reconstruction of Keats House as a standalone building and a more positive contributor to the local street scape.

This method statement:

- Highlights the current questions regarding the original construction;
- describes the proposed method for carefully dismantling and storing the upper levels of the façades;
- proposes methodology for reconstruction including brick and stone selection, mortar designation, design and cleaning; and
- details design interfaces that need to be satisfied for the transition from a building to a monolithic retained masonry façade.

With all historic buildings there is an element of discovery during the dismantling as the original construction method and details become apparent. Therefore, this method statement describes the process for undertaking the works. Any material specification will be subject to extensive research during the dismantling process to ensure that the correct methodology is used.

Background Information



From our research it would appear that the buildings are not listed but are buildings of merit as part of the Borough High Street Conservation Area. This incorporates the buildings in the Square and surrounding blocks.

Two houses were erected by the governors of Guy's Hospital for the purpose of providing residences for two of their medical staff, who were required to be in almost constant attendance at the hospital.

The principal materials used are red brick with Bath stone dressings. The columns of the portico are of polished granite.

Messrs. Newman & Billing, of Tooley Street, were the architects employed by the governors; and the works were executed by Mef srs. J. J. & F. Coleman, of Bermondsey. There are in the design, suggestive features that will doubtless be farther worked upon."

From The Builder, September 12, 1863

3.0 Current condition.

In October 2018 a mobile aerial working platform was used to provide a close visual survey of the front façade and a ground penetrating radar (GPR) survey of the elevation.

The key objectives of the survey were:

- Identify any fine fracturing to the masonry which could indicate underlying defects.
- Determine the depth of the masonry construction at various levels.
- Establish the construction of the grand cornice at roof level.
- Ascertain the depth of coverage of any embedded steelwork within the masonry where the stone was of a suitable flat profile to facilitate the recording.

3.1 The GPR survey

A GSSI SIR 3000 Ground Penetrating Radar system was used with 2.0GHz and 900MHz antennas.

The 2.0 GHz antenna would typically penetrate to a depth of 400mm and was considered the most appropriate for detecting shallow features in the stonework whilst the 900MHz antenna would typically penetrate to approximately 1m in stonework and 1.5m in brickwork. The 900MHz antenna was considered the most appropriate for detecting the deeper features, albeit with a loss in resolution.

Calibration:

The GPR utilises a survey wheel which measures the distance travelled by the antenna and regulates the scan rate so that scans can have a meaningful proportion. Distance measurement is regularly calibrated and saved within the GPR system and an off site check over a distance of 1.5m was conducted and found to be accurate.

Depth calibration was undertaken insitu on the stonework columns on the ground floor. The relative permittivity was adjusted on the GPR equipment until the correct thickness reading was achieved. A figure of 5.92 was thus derived for the stonework.

A generic figure of 3.50 permittivity was used for the brickwork as there were no areas where the depth could be checked and cross referenced.

The depths and thicknesses noted within the report have been calculated using the figures above.

3.2 Results.

The area highlighted in yellow was scanned to determine the depth of brickwork construction.

The area highlighted in green was scanned to determine the depth of stone wall construction

The area highlighted in red was scanned to determine the depth of the cornice capping section of the wall.

The photographic plates (1-5) on the following pages record the GPR survey of the flat surfaced masonry within the basement level where we were able to accurately determine the depth of wall construction and location of any extraneous metalwork (fixings).

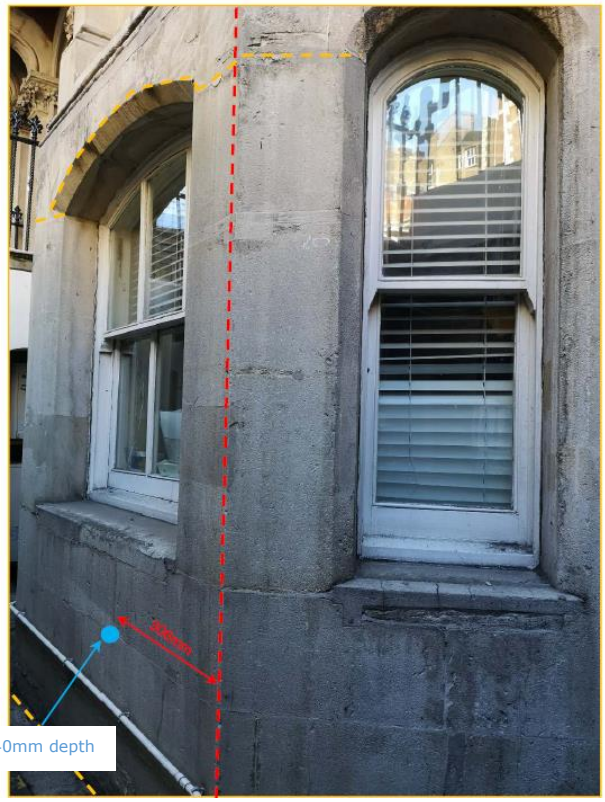


Plate 1

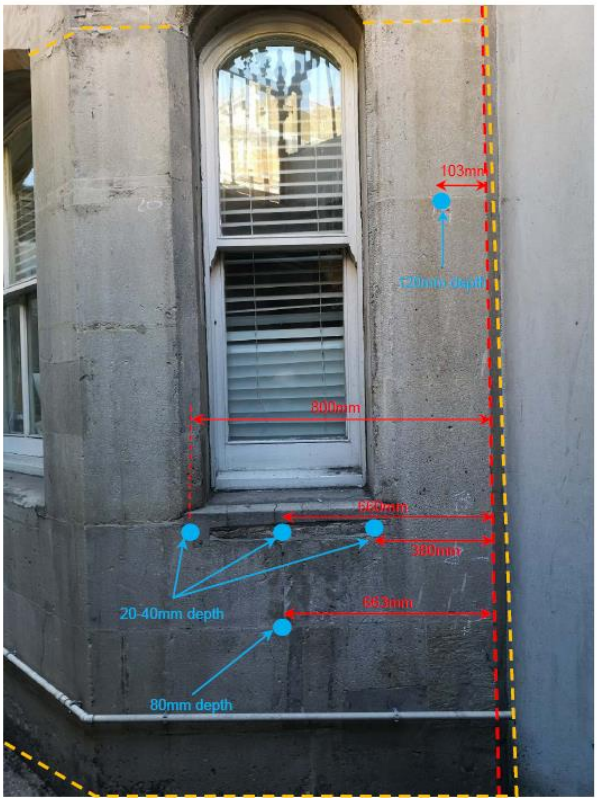


Plate 2

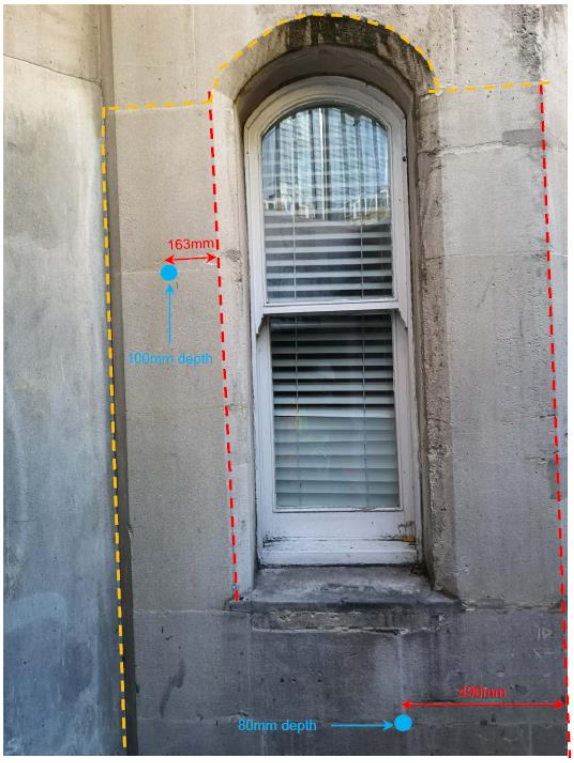


Plate 3

Plate 4

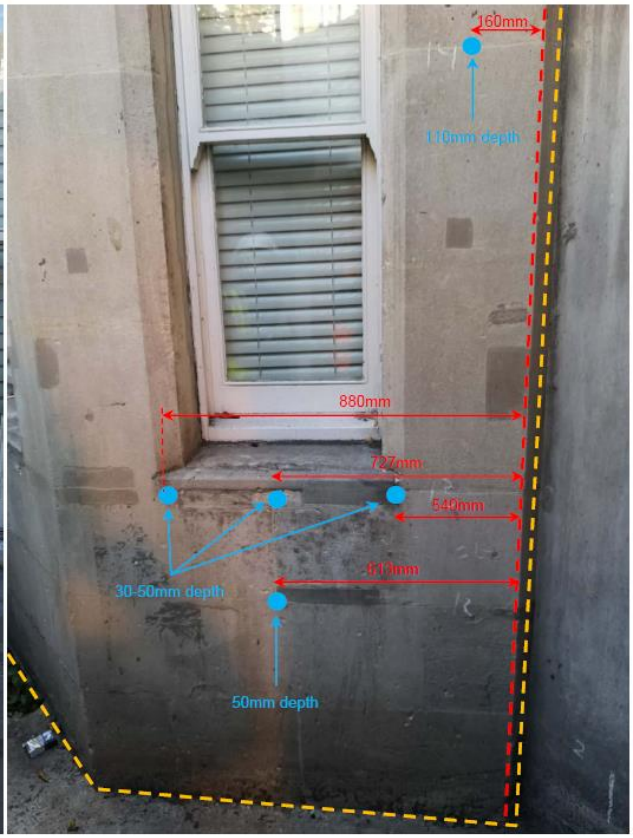


Plate 5

Using the GPR we were able to determine the general thickness of construction.

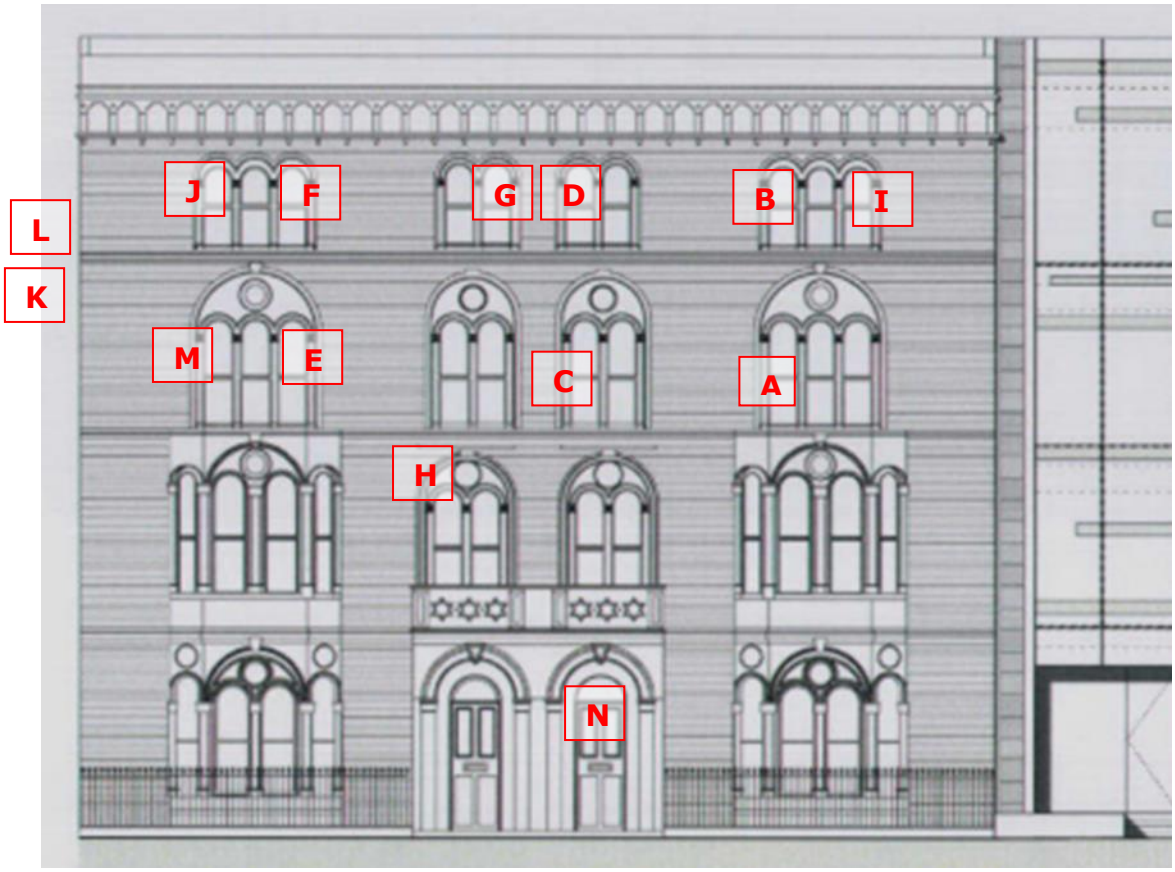
A layer of interface likely to be the back face of the masonry was detected at the following depth within the scanned areas:

- Grand cornice 650mm – 700mm depth
- Brickwork areas were 320 – 340mm deep
- Stonework was 420-460mm deep

A number of metallic features were detected within the flat areas of masonry with varying masonry cover between 20mm – 120mm as shown on the following images:

3.3 Photographic record.

A close inspection of the façade was completed and on the following pages the significant defects have been recorded.



A	Window jamb
B	Window jamb
C	Window jamb
D	Window jamb
E	Window jamb
F	Window jamb
G	Window jamb
H	Jamb column capital
I	Window jamb
J	Window jamb
K	Elevation view
L	Elevation view
M	Window jamb
N	Entrance portico

On the photographs on the following pages fractures and masonry displacement have been highlighted in red

A Fracturing to window reveal typical of the cracking force of the corrosion expansion of a metal restraint cramp – 'dog cramp'.

B Fracturing to window reveal typical of the cracking force of the corrosion expansion of a metal restraint cramp – 'dog cramp'.

C Fracturing to window reveal typical of the cracking force of the corrosion expansion of a metal restraint cramp – 'dog cramp'.

D Fracturing to window reveal typical of the cracking force of the corrosion expansion of a metal restraint cramp – 'dog cramp'.

E Fracturing to window reveal typical of the cracking force of the corrosion expansion of a metal restraint cramp – 'dog cramp'.

F Fracturing to window reveal typical of the cracking force of the corrosion expansion of a metal restraint cramp – 'dog cramp'.

G Fracturing to window reveal typical of the cracking force of the corrosion expansion of a metal restraint cramp – 'dog cramp'.

H The jamb capitals have been coated with some form of impermeable liquid. The application is not precise so we assume that the intention was to consolidate and protect the stone rather than provide a different surface appearance.

I Fracturing to window reveal typical of the cracking force of the corrosion expansion of a metal restraint cramp – 'dog cramp'.

J Fracturing to window reveal typical of the cracking force of the corrosion expansion of a metal restraint cramp – 'dog cramp'.

K On the east return to the façade, two windows have been infilled with new brickwork.

The size, surface texture and brick colour do not match the original.

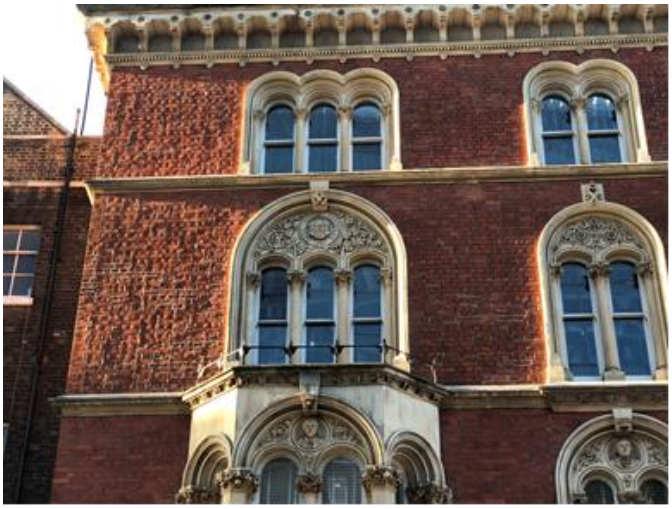
L Most of the horizontal stone bands have been restored with a cementitious mortar.

M The bed joint between the column and capital has displaced with evidence of repointing / repair.

N3.4 The internal arches to the entrance portico have fractured which would suggest that the arch has moved

3.4 Brickwork general assessment.

The bricks are a soft handmade imperial light / medium red brick.



The bricks would appear to be porous with a loose and friable surface and a very thin fired skin indicative of a low firing temperature.

There is a high proportion of bricks with fractures.

The brickwork joints are relatively tight at 6-8mm with a range of pointing styles including

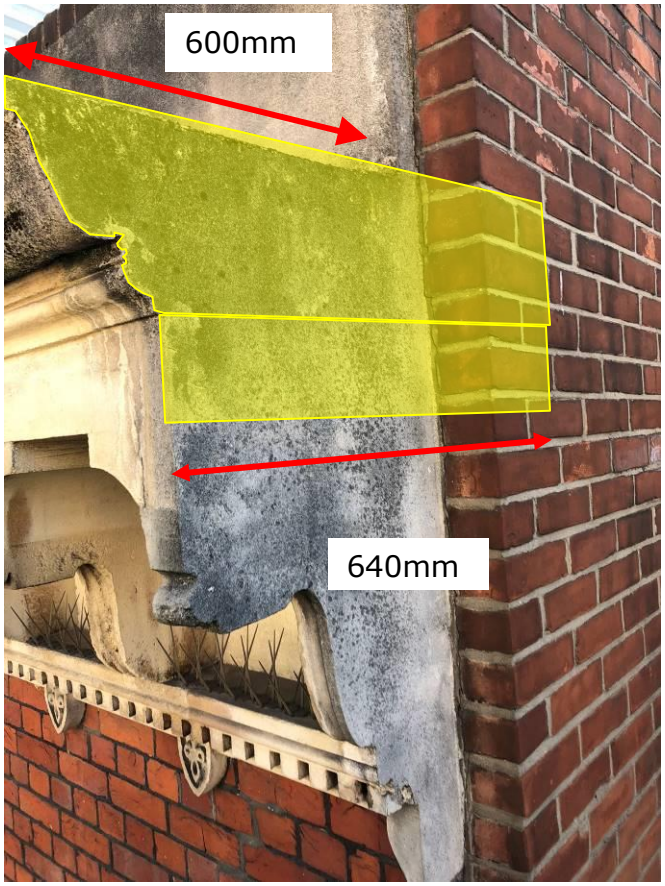
- Red stopping mortar
- Black tuck point
- Black mortar pointing
- Grey repair mortar

3.5 Cornice construction.

The cornice is constructed in five courses of stone with the lower three courses providing a corbelling support to the fascia and cornice course.

The sky surface has a considerable fall of 50mm but is uncovered with extensive staining.

On similar projects this cornice would be covered with code 6 lead and a welted drip to provide long term protection to the façade.



4.0 Proposed dismantling methodology.

The proposals relating to the dismantling of the facade can be divided into three separate steps as follows:

- **Surveys**
- **Careful dismantling of the facade**
- **Storage off site of the façade**

4.1 Surveys

Surveys will be completed for verifying the accuracy of early survey information. They will be undertaken from access scaffolding before and during the dismantling process to ensure that the original method of construction is recorded to enable the facade to be re-constructed in accordance with the proposed drawings and original construction details.

Survey information and photographic records will be taken at regular intervals during the dismantling process.

The verified records will include:

CAD plans showing stone block and brick core arrangements at every stone course in line with provided survey information.

Photographic record of stone block and brick arrangements at every course for each of the four existing piers.

CAD elevations and plans showing stone block and brick arrangement.

Photographic records of joggles and other stone fixing details.

Control dimensions will be recorded.

Physical examination of the structure.

The physical examination of the structure will be carried out so that the disassembly of the facade can be done in a manner that will not raise unexpected problems.

PAYE suggest investigating the constructional aspects of the facade as follows:

A sample panel of brickwork to be carefully dismantled to determine the method of original construction through the analysis of the mortars.

Rebuild a panel with matched bricks to demonstrate the capability to reconstruct the façade to match the original appearance.

- A GPR (x-ray) survey to be completed to assess the depth of construction and ascertain the extent of embedded structural and extraneous steelwork.
- Small investigation pockets to be created internally to expose the back face of the masonry and the assumed position of the steel frame.
- Condition survey of the red sandstone balconies to consider any special measures necessary to protect and temporarily support them during the development process.

4.2 Careful dismantling of the facade

Particular care will be required to protect adjacent buildings. There is a party wall that extends upwards of 26 St Thomas's Street.

PAYE will use best endeavours to maximise the extent of stone to be used for reinstatement.

A more detailed method statement explaining the sequence of demolition will need to be agreed with the professional team once the dimensional survey works are complete. However, the general sequence is indicated below:

Suggested Works Sequence:

4.3 Outline technical method for stone removal

With solid loadbearing masonry walls, it is necessary to complete a dismantling strategy plan prior to commencing the works.

The procedure defined within this plan will establish the weight of individual masonry units, the load path through the façade and the most appropriate sequencing for removal to prevent the undermining or destabilising of individual masonry units.

The plan would enable temporary support, lifting beams, scaffold adaptations to be designed and installed. This task would be completed prior to commencing the stone removal.

The next step would be to:

- Locate and mark out the stonework to be dismantled and, using hand tools and small electrical cutters, cut out and free joints. The use of angle grinders/cutters must be restricted to experienced and trained masons to avoid the risk of damaging adjacent stone arrises.
- From the top of the facade downwards systematically remove stonework, with the assistance of hand tools and appropriately rated lifting equipment, attached to the scaffold and set aside on the scaffold. Monitor the stability of the remaining structure and where required insert temporary supports and restraints, particularly to the feature columns/capitals where instability could become apparent as soon as ascending masonry courses are removed.
- Remove masonry to the designated storage area with the assistance of bogeys and trolleys, and store on timber bearers.
- Throughout the operation utilise packing and spacers to preserve the integrity of the masonry unit.
- Using hand tools remove residual mortar from all faces of the stones. It is critical that the cleaning off process is done extremely carefully and comprehensively to ensure that the facade can be erected with the same size mortar joints.

The method of lifting the stones is as follows:

- Cut perimeter joints to loosen stones.
- Using timber wedges on the finished face and chisels to the back face, loosen the stone and break the bond.
- Drill a lewis pin hole of 28mm diameter in the top surface of the stone on or near the centroid. Re-use previous lewis holes where possible.
- Insert the pins and raise the stone sufficiently to install skids to allow lifting straps to be used.
- The lewis pins will be connected to a block and tackle/lifting beam with jockey suspended from the designed scaffold.
- Each stone will be lowered onto the pallet at the end of the runway beam, banded and shrink wrapped to assist safe lifting procedures.
- The dismantling procedure is top down. No stones can be removed if it will undermine the load transfer of the remainder of the wall.
- As each stone is dismantled the beds will be cleaned and marked with a unique reference number, then palletised for removal to storage.
- PAYE will be responsible for carefully and accurately recording the brick sub-structure and coursing that will be exposed during the removal of each stone course.

Crane attendance may be required for some elements of the work, in particular the cornice stones. The weight of individual units will be calculated.

An early meeting would be held with the scaffold contractor to ensure the adequacy of the scaffold design and to identify requirements to adapt the scaffold during the works to facilitate crane assistance etc.

At this stage it is anticipated that the stones can be carefully lifted using a block and tackle attached to a continuous lifting beam, fixed to the scaffold.

There is a brickwork lining wall to the stonework on No. 21. PAYE would remove any masonry that is required to necessitate the release of stonework carefully and safely. Redundant brickwork would be removed by the demolition contractor as necessary.

4.4 Storage

4.4.1 Storage Facilities

PAYE stores all dismantled masonry undercover within a secure warehouse located at Gravesend, London which we have adapted specifically to store dismantled stone structures. It is an internal space where complete façades can be stored in a stable environment.

The warehouse is manned daily from 7am until 5pm and is within a gated compound with 24 hour security.

4.4.2 Storage Methodology

All the stones that will be taken down from the facade will be individually numbered and placed on pallets. The numbering carried out will be done using paint or other indelible marker on one of the hidden faces of the stonework. It is acceptable for stone marks to be cut into the concealed faces of the stonework if that is preferred method of identification.

The stones will then be placed on timber pallets capable of being lifted by fork lift trucks without damage. They are protected with 50mm polystyrene sheeting (or thicker if more than one stone is stored on a pallet). They are then banded and shrink wrapped ready for loading onto a flat bed lorry. To prevent stones from being delivered back to site in an unsequenced fashion, only stones from adjacent positions will be stored on the same pallet.

All the pallets will also be numbered to allow cross referencing of the stones on a chart for ease of identification, transport and storage. A notice will be stapled to the pallet and also placed upon the stone prior to shrink wrapping that will clearly state the pallet number, the reference number of each stone contained on the pallet and the owner of the stone units.

Because the first stones into the storage area will be the last ones rebuilt, the pallets are offloaded to reflect this and to minimise the moving of pallets within the storage area. It is essential that the pallets are stored in a manner to minimise double handling of the pallets. This will minimise the risk of damage to the stones during storage periods.

On the 'dismantling checking schedule' the position of each pallet within the storage area will be recorded using an alpha-numeric grid reference to facilitate checking of the stones if required.

The stones are stacked in rows that correlate to architectural details or courses of masonry on site to facilitate easy retrieval for reconstruction. Masonry units that require repair or reworking would be placed in a dedicated aisle and once

the remedial works are complete the pallet would be stored within the correct aisle until it is called for reconstruction

Any necessary cleaning of residual cement mortar, paint or staining of the stonework will be carried out before the reconstruction phase begins and the stones are returned to the site. Repairs and alterations to individual stones will also occur in the storage period. This allows the rebuilding process to happen in a timely manner once on site.

Return delivery to site will be a simple reverse of the procedure for removal of the pallets ensuring that delivery is coordinated with the main contractor and all other contractors who would be using the site lifting facilities.

5.0 Reconstruction of the façade

The proposal is to reconstruct the façade restrained back to a new structural frame and incorporating stainless steel restraint fixings in lieu of the existing corroding fixings.

5.1 Procurement of materials

5.1.1 Brickwork

We would look to source bricks to match the existing façade. A number of samples would be obtained for approval by the architect. PAYE have extensive experience matching bricks for the repair and adaptation of historic façades.

The proposed brick is a hand made imperial light / medium colour red.

5.1.2 Stone

New stone will be required to provide repair / replacement for those stones which can not be retained and used within the reconstruction.

The following criteria would be considered during stone selection:

- Stone Colour
- Shell content
- Shell grain
- Surface finish

The selected supplier will provide control samples of stone to be used.

Redundant salvaged stone from the dismantling of the facades would be used for repairs.

Stones required for the project are:

- Portland Whitbed limestone
- Bath stone

5.2 Cleaning and Repair

5.2.1 Stone

The proposed method of cleaning for the stonework would be masons nebulous water clean. It is generally appropriate for the façade to be cleaned prior to dismantling.

If following this cleaning method there are still parts of the façade that are heavily soiled, then we would look to locally treat these areas with a low pressure air abrasive system using a soft abrasive medium.

The philosophy for the stonework repair that will be applied by the team will be as follows:

- a) Damage of historic interest, i.e. war damage, should be preserved;
- b) Damage caused by accidental mishap, vandalism or wear and tear should be repaired and re-instated by indenting of new stone.

Each stone will be examined on an individual basis, both when the facade is taken down and then subsequently when the stones are re-erected to assess the extent of any repairs required.

Minor defects and non-structural repairs should be treated according to the following logic:

- Drill damage/ repairs to holes from previous fixings less than 20mm diameter should receive a simple mortar repair.
- Drill damage/ repairs to holes from previous fixings greater than 20mm diameter should receive a stone insert repair.
- Staining will be removed by poultices.
- Repairs to linear cracks will be assessed onsite.

5.2.2 Brickwork

For cleaning the brickwork, we would recommend a pressurised hot water/steam treatment.

Repointing would be with either a weak cementitious or hydraulic lime mortar subject to testing. We would take samples for testing before designing a mortar mix to match.

PAYE will design mortar mixes to match colour, texture, porosities and finishes of existing mortars.

Replacement bricks will be purpose made to match imperial sizes, colour, texture and dimensional tolerances.

6.0 Project Experience

6.1 210 – 211 Piccadilly, London

210 – 211 Piccadilly formed part of the island site redevelopment for the Crown Estate and was a late 19th Century solid loadbearing masonry façade partly hidden behind un-sympathetic 1970's adaptations.

Because of our experience and knowledge of the recording, dismantling and reconstruction of solid masonry buildings PAYE were appointed by the Crown Estate to undertake the task of surveying, dismantling, storing and rebuilding the facades including complete new ground floor shopfront and increasing the building in height by 1.7m.

6.2 Aston Webb Screen, Victoria and Albert Museum

As part of the major re-development of the courtyard to provide additional exhibition space the Grade 1 listed Aston Webb screen was dismantled to provide site access for excavation. The screen is now being replaced with adapted openings to provide free flow access to the new courtyard and exhibition galleries.

Following a detailed photographic and dimensional survey PAYE's masons began the careful and meticulous process of dismantling the masonry screen using modern and traditional techniques to cut through joints and separate the solid sections of stone.

Each joint was carefully cut out to prevent the risk of damage to adjacent stones. Using traditional plug and feathers the stone joints were split apart breaking the mortar used to bond them together.

Some of the larger stones weighed 1 tonne and were handled on site using a block and tackle fixed to a running rail.






6.3 Fortnum and Mason

PAYE were appointed to construct the intricately detailed front elevation which is comprised of stone window surrounds and cornices and red rubbed bricks with 2mm joints.

6.4 Unison House

A new Portico and boundary wall was required to match an existing façade. This was replicated by PAYE from an old photograph.